THE AMERICAN MINERALOGIST
JOURNAL OF THE MINERALOGICAL SOCIETY OF AMERICA

VOL. 6 APRIL, 1921 No. 4

THE ETCHING FIGURES OF TOPAZ

ARTHUR P. HONESS

Princeton University

In view of the fact that a detailed study of the etching figures of topaz has not been attempted, and in consequence of doubt expressed by certain authors as to the holohedral character of this mineral, the results of a careful examination of the etchings of the fundamental forms may be of interest. Baumhauer[1] was able to obtain distinct figures on the base and unit prism of Brazilian topaz, by means of potassium hydroxide. The base figures are rhombic and oriented with the sides parallel to the edge 001/110. They are usually composed of four faces so placed as to be divisible by two symmetry planes, which accords with the holohedral class. The prism faces are marked by many quadrilateral depressions, elongated in the direction of the *c* axis, and divisible by an equatorial plane of symmetry (also indicating holohedrism).

E. S. Fedorov[2] described natural etchings occurring on topaz crystals from Alabaschka and Urulga, the description being illustrated by seven large photographs. He observed the following: a constancy of the type of etch figures occurring on equivalent faces; the presence of two kinds of figures, that is, a formation of etch figures on faces, which have arisen thru etching; and a very noticeable difference in the etchings of different crystal forms. References to work on the etching of topaz, by Goldschmidt and Rosicky, have been seen, but the original article has not been accessible to the writer.

Owing to the abundance of suitable material obtained from the Thomas Mountain locality, in Utah, little difficulty was experienced in selecting clear brownish crystals which were very satisfactory for the purpose of etching. Altho six fundamental forms are common in this locality, the seventh, the macropinacoid, (100), is apparently always wanting; the extreme rarity of this form was not really appreciated, until a diligent search thru the Princeton Museum specimens, coming from a variety of localities, failed to reveal a single crystal bearing this face.

---

[1] *Neues Jahrb. Min. Geol.*, **1876**, 5.

[2] *Ann. Inst. Mines* **1**, 1908.

Topaz, being a very insoluble mineral, is little attacked by acids; consequently, fusions similar to those which have been used for etching tourmaline were employed for the investigation of the topaz etching figures. Potassium hydroxide, if concentrated, was found to corrode the crystal, so that a more dilute fusion was prepared by adding a little water; as this solution becomes more and more concentrated the crystal is attacked quite readily, the six forms revealing figures as seen in diagram A, where the holohedral symmetry of the orthorhombic system is demonstrated.

Unit Prism (110)

Several minutes immersion in the potassium hydroxide fusion produces distinct etchings on this form. (See Fig. 1.) They are for the most part composed of five faces in the mature stage of development and are slightly elongated parallel to the prism edges. The primitive figures are usually semi-circular but have very little relief; consequently, if there are lateral faces present at this stage of growth, they are microscopic.

The mature figures are generally quadrilateral in outline, altho either of the two longer boundaries may be modified at the ends by two short straight lines. These longer boundaries may be curved or straight. The ends of the figures are similarly developed, being limited by a short straight line inclined to the prism edge at an angle of approximately 85°; thus the figures are symmetrical to an equatorial plane.

If a red-hot fusion of potassium bisulfate and powdered fluorite, mixed in a proportion of three to one, is allowed to act upon topaz for a period of forty minutes, the unit prism presents an appearance not unlike that of the potassium hydroxide fusion. The figures, however, are more rectangular in outline, and composed of four or five faces accordingly as the figures are mature or primitive. (See Fig. 2). In the mature etchings, the four bounding faces are usually triangular and meet at a point well to one side of the figure. Like the figures previously described, the two larger planes lie in the prism zone, hence the etchings are elongated parallel to the prism edges, and altho the contour at first appears symmetrical in two directions, closer examination reveals two faces lying in the prism zone which are not of the same intercept. The ends of the figure above and below are similarly developed; consequently, the etchings indicate an equatorial plane of symmetry.

Prism (120)

This form is usually more or less striated, so that the etching is very apt to proceed too rapidly, unless precautions are used. Nevertheless, the two solvents used for the previous etchings gave equally as good results upon the prism *l*. The etch-figures produced by immersion of four minutes in a dilute fusion of potassium hydroxide are represented in fig. 3. They are oval figures, acute at either end and elongated parallel to the prism edges. Of the two longer contours, the one adjacent to edge 110/120 is more sharply curved, indicating an absence of a vertical plane of symmetry. As solution continues the ends of the figures become modified thru the continuation of the larger face as a pointed appendage. This may be seen in diagram A, which, in the most mature stage of development, marks the intersection of a small triangular face with the surface of the crystal. It is surprising what a change from simplicity to complexity takes place in the evolution of the etch figures as solution goes on; but never at any stage does the etching fail to meet the symmetry requirement of the prism face, which in this case consists of an equatorial plane of symmetry.

Figure 4 represents the etchings produced on the prism, (120) after immersion in the potassium bisulfate and fluorite fusion for forty minutes. These figures are very similar to those just described in the mature stage, but in the earlier stages of development the pointed appendages, so prominent on the KOH figures, do not appear to be present. These etchings are fan-shaped, with three distinct faces grouped about one side of the central portion of the figures. Opposite these there lies a large face which descends gradually from the crystal surface to the deeper portion of the figures, and the contour of which is a symmetrical curve. The figures, altho very complex, are symmetrical above and below the equatorial plane.

BRACHYPINACOID (010)

Altho the brachypinacoid is frequently present on the Thomas Mts. crystals, the face is usually small and reveals only a few well defined etchings. (See Fig. 5). The figures are simple elliptical forms with the elongation parallel to the *a* axis; they are usually composed of four faces symmetrically arranged in pairs, with a groove running thru the center of the figures, parallel to the short axis of the ellipse. In accordance with the type they indicate two planes of symmetry, one passing thru the b and c axes, the other the equatorial plane. Hence, the various etchings of the prism zone are alike, in that they are all symmetrical to an equatorial plane.

PYRAMIDS

The pyramids (221) and (111) are well developed and yield very fine etchings after only a brief immersion in the potassium hydroxide fusion. (See diagram A.) The figures occurring on (221) are simple triangular pits, usually composed of three faces, asymmetrically arranged. The figures are elongated in a direction inclined to the edge 221/110, with the acute end turned toward the macrodome. The base of the triangles is often continued, producing a pointed appendage at the larger angle of the figures. (See Fig. 6). The etchings by their positions on adjacent faces indicate two vertical planes of symmetry in the crystal, but the pyramid faces, as indicated by the form of the etchings, possess a molecular configuration which is asymmetrical.

The unit pyramid behaves very similarly to the (221) form and the figures are only slightly different. (See diagram A, and Fig. 7.) They have a similar orientation and are asymmetrical; they are also much more elongated, possessing curved boundaries, and being rounded at the acute angle. Like the etchings of (221), their position on adjacent pyramid faces indicates the presence of two symmetry planes.

DOMES

Of the two domes present, (201) and (041), the brachydome is usually better developed and is acted upon by the alkali fusion more rapidly than the other form. Immersion in dilute potassium hydroxide fusion for a time sufficient to corrode the brachydome, produced only a few small etch pits on the macro form. This difference of solubility is not so marked in the case of the potassium bisulfate-fluorite fusion. It is to be observed, however, that such a comparison of the relative solubilities of the two forms can be made only when both faces are of like perfection, for often a more insoluble form is very readily attacked by solvents, because of an imperfect or rough surface. The great necessity of a perfect crystal surface for the investigation of artificial etchings cannot be over-emphasized.

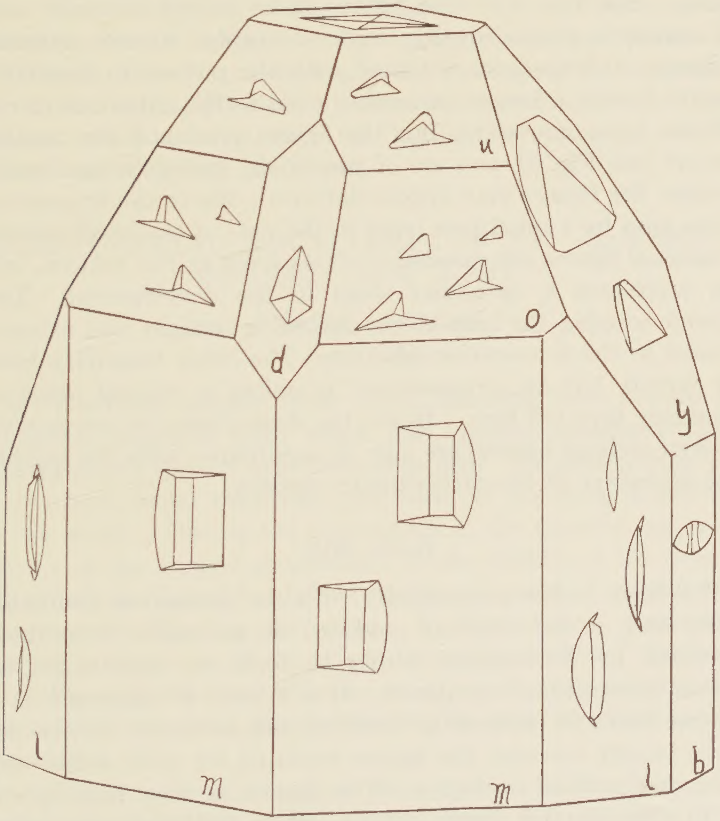


Diagram A. Etching Figures on Topaz

Well defined etchings were obtained on the macrodome after several minutes immersion in a dilute fusion of potassium hydroxide. The figures, altho small, appear as illustrated in diagram A, Form d. They are composed of three or four faces, and are usually hexagonal, broader at the lower end and elongated vertically. The figures are symmetrical to a vertical plane.

The brachydome etches with great ease if immersed in either of the two fusions. The figures produced by potassium hydroxide are illustrated in diagram A, Form y. There are present three faces, the largest of which is triangular and lies in the zone of the brachydome and base. At either side there is a narrow curved face which extends the entire length of the figures and these meeting form the acute apex of the triangular etching figure. (See Fig. 8.) The figures have curved contours and are oriented symmetrically, with the apex turned upward. Different etchings were obtained with the potassium bisulfate-fluorite fusion; a longer immersion even to the extent of thirty minutes being necessary, but the figures produced are usually distinct (see Fig. 9), and are of two kinds, triangular and semicircular; the former may appear flattened, due to the truncation of the apex by a small face lying in the zone of the brachydome. Occasional figures are marked by faces lying at the bottom, but this represents a particular stage in the development. The contour forming the base of the figures is straight and extends parallel to the intersection 041/010. The other boundary lines are curved, but are symmetrical, revealing a vertical plane of symmetry thru the face. Hence the dome faces, as represented by their etching figures, are also in accordance with the holohedral symmetry of the orthorhombic system.

BASE (001)

This form etches very rapidly with the potassium hydroxide fusion and, as the etchings produced do not differ from those described by Baumhauer, either in form or orientation, no further description is required. If a crystal is immersed in a red-hot fusion of potassium bisulfate and powdered fluorite for about twenty minutes, the figures resulting are quite unlike any hitherto described on topaz. The figures as they first appear are to a considerable degree circular, with a very slight elongation parallel to *b*. (See Fig. 10, *a*.) As solution continues the figures become deeper and angular (see Fig. 10 *b*); they become rhombic forms, the diagonals of which appear to be approximately of the same length; the contour is still rounded to a small degree and remains so, the continued development being one of complexity, and confined to the inner portion of the pit. (See Fig. 10 *c*.) This development as observed under greater magnification includes the formation of a long rhombic pit within the primitive figures and elongated parallel to *a*; each side of this rhombic form is subdivided into two faces, as the mature stage approaches, producing as the ultimate form, Fig. 11, an etching bearing the primitive outline inset with an elongated octagonal pit, extending parallel to the brachy-axis and divisible by two symmetry planes. This manner of growth, while involving a great many changes, never alters the figure to a form other than one which accurately indicates the symmetry of the basal pinacoid.

Topaz is, therefore, according to the etchings of six fundamental crystal forms, divisible by three symmetry planes at right angles, which accords with the holohedral symmetry of the orthorhombic system of crystals.

SOME CRYSTAL LOCALITIES IN ST. LAWRENCE COUNTY, NEW YORK[1]

WILLIAM J. MILLER
Smith College

St. Lawrence county, New York, has long been famous for numerous localities from which fine mineral specimens representing many species have been obtained. Specimens from this region have found their way into many of the mineral cabinets of the world. During the prosecution of the detailed geological survey of the Russell quadrangle, in the middle of the county, a number of mineral localities (mostly new ones) of considerable interest were found by the writer. At most of these places good crystals and groups of crystals of tremolite, diopside, and hornblende may be obtained with the aid of a geologist's hammer, but much better material would doubtless be found by blasting open the ledges.

---

[1] Published by permission of the State Geologist of New York. [The famous mineral localities of St. Lawrence County have not been treated in this series of articles heretofore; but we are glad to report that in addition to the present description of several new localities, we have on hand a manuscript in which all of the older ones are described in great detail; this will be published when space permits, in the course of the next 3 or 4 months. Ed.]

TREMOLITE

Close to the road 0.7 kilometer (2/5 mile) east of West Pierrepont, and also at and near the corners 2½ km. (1½ miles) east of the same place, limestone contains bunches of long prismatic crystals of light gray tremolite commonly ranging in length from ½ to 5 centimeters. Many of the crystals are well formed, with good terminations. Parallel growths are common.

About 0.7 kilometer (2/5 mile) a little south of west of Endersbees Corners a big outcrop of limestone contains fissures, 5 meters or more long and up to 3 decimeters wide, filled with interlocking relatively slender crystals of nearly pure white to colorless tremolite. The crystals range up to 7 cm. long, but good terminations are not common. Very fine large masses of the interlocking crystals may be obtained.

In limestone 0.9 km. (½ mile) southeast of East Road school, small groups of short stout crystals of light gray tremolite occur. They range in length up to 3 cm. and most of them are almost perfectly formed, many having excellent terminations. Groups of similar crystals occur in schist associated with some limestone 0.9 km. (½ mile) southwest of Van House Corners.

Very large crystals of light gray tremolite occur a few meters west of the road near a maple sugar house on top of Hamilton Hill, about 1 km. south of Russell. The tremolite seems to lie at or near the contact between a big pegmatite dike and Grenville pyritous gneiss. Some of the crystals are over a half meter long and 15 to 25 cm. thick, but crystal faces are not well developed on them, and they break to pieces easily along cleavage planes. Good specimens 15 cm. long, showing parallel growths, with some fairly well developed crystal faces may be obtained.

DIOPSIDE

About 0.3 kilometer (⅕ mile) northeast of East Road school a ledge of limestone contains many crystals of diopside. This may be the place mentioned by Smyth[1] who says: "Here the minerals are pyroxene (a diopside variety in very large crystals), gray amphibole, feldspar, scapolite, phlogopite, and tourmaline. The minerals fill irregular pockets or short veins, scattered through the limestone." There are many good diopsides 3 to 5 cm. long. Within a cavity in the limestone, but well out of reach, the writer saw a well formed crystal of the diopside probably at least 2½ decimeters long. It would be difficult, if not impossible, to get out this large specimen in its entirety.

---

[1] C. H. Smyth. *Trans. N. Y. Acad. Sci.*, **15**, 267–268, 1896.

Veins in limestone near the road 2½ km. (1½ miles) east of West Pierrepont (just west of Moore's Corners) contain coarse calcite thickly set with crystals of diopside and some masses of phlogopite. The well formed, relatively slender, prismatic diopside crystals range in length up to 2 centimeters. Weathered specimens best show the crystals.

Limestone 0.7 km (2/5 mile) south of Clark's Corners contains many more or less well formed crystals of light green monoclinic pyroxene (probably diopside) up to 5 cm. in length.

Hornblende

Groups of excellent black hornblende crystals occur in veins in syenite along its contact with a small mass of included limestone 0.4 km. (¼ mile) south of Jones pond near the southwestern corner of the quadrangle. Solid masses of crystals 15 cm. across are readily obtainable, and a little blasting would yield better specimens. The crystals are stout prisms, usually very well formed with double terminations, and from 1 to 2 cm. in length.

Origin of the Crystals

The origin of all the crystals above described is believed to have been about as follows. During the intrusion of the igneous rocks (granite-syenite series), magmatic vapors or juices were given off and penetrated or came into contact with, and dissolved, some of the (Grenville) limestone. Under varying local conditions crystals of tremolite, diopside, and hornblende developed from the lime-rich magmatic solutions. In all cases limestone is either actually the rock containing the crystals, or is close by, and the igneous rock is either directly associated with the crystals, or is likewise relatively near.

Corrections to List of Fellows of M. S. A.

Page 46 (February number), change address of Dr. Elliot Q. Adams to: Nela Park, Cleveland, Ohio.

Add after Prof. Crawford: Dr. A. R. Crook, State Museum, Springfield, Ill.

Page 47, after Prof. Richardson add: Prof. Heinrich Ries, Cornell University, Ithaca, N. Y.

After Prof. Winchell add: Prof. John E. Wolff, Harvard University, Cambridge, Mass.

BOOK REVIEW

MINERALOGY, AN INTRODUCTION TO THE STUDY OF MINERALS AND CRYSTALS. Edward H. Kraus and Walter F. Hunt. 561 pages. McGraw Hill Book Co., Inc., New York, 1920.

Of late years the number of textbooks on mineralogy has increased to such an extent that with the appearance of each addition to the list we naturally look for some new and improved features to commend it over its predecessors. The work of Doctors Kraus and Hunt shows a number of these innovations distributed thruout its 561 pages, of which 371 are devoted to subject matter and 176 to determinative tables. In the matter of half tone text cuts the authors have been fortunate both in the selection of illustrative matter and in the excellence with which this has been reproduced.

The chapters on Crystallography are well planned and clearly presented, altho one misses the exposition of crystal structure as a logical basis of the mathematical crystallography which is so fully dealt with. These chapters are exceptionally well illustrated with line cuts of great clearness as well as some excellent half tones of crystal models, the latter being a distinct innovation. As it is to be expected in a student text book the chapter on optical mineralogy is brief, but here the important facts have been well chosen and emphasized, and again the illustrative cuts are beyond criticism. The same may be said for the short chapter on Formation and Occurrence. The chapter on Qualitative Blowpipe Methods is better than anything that has as yet appeared in a similar text book, and is eminently practical and comprehensive.

The descriptive portion of the book is confined to the discussion of 150 important mineral species and follows the Groth classification. In the choice of these 150 species the authors have attempted a somewhat difficult task and there will possibly be some objectors to certain inclusions and omissions but on the whole the selection has been well and fairly done. A feature which will commend itself to any one who has used a book of this type is the Classification of Minerals according to Elements (chapter XVI). This arrangement is extremely useful and the economic data and production statistics in the text are both up to date and accurate.

The determinative tables which take up the concluding pages are comprehensive and very usable, giving as they do at a glance the salient characters under each species. Thruout the work are inserted small half tone portraits of the men who have earned distinction in every department of the science. This portrait gallery of worthies is another of those unique features for which the authors should be congratulated. H. P. W.

NOTES AND NEWS

In the *Annual Report of the U. S. National Museum for* **1918–19**, the following noteworthy accessions of minerals are recorded: A remarkably large and perfect bi-pyramidal crystal of scheelite, 8 cm. in maximum diameter and weighing 529 grams, from Korea, presented by Dr. J. Morgan Clements: realgar and arsenolite from China; chlorite with ankerite and with siderite; the new or rare minerals hodgkinsonite, riversideite, and ferrierite; and aguilarite, previously unrepresented in the collection.

Thru the Frances Lea Chamberlain Fund, the following were added to the Isaac Lea collection of gems: 5 opals from Australia; a cut zircon weighing 51 carats; 2 turquoises, one kunzite, one black opal, two benitoites, carvings of nephrite and of chalcedony, some fresh-water pearls from Tennessee, and 30 gems cut from minerals in the Museum collection.

In a reprint from the *Proceedings of the U. S. National Museum* (**58**, 303–305, 3 plates, 1920), Mr. William F. Foshag, Assistant Curator in charge of the mineralogical collections, describes some recent accessions to those collections, mostly gifts from individuals, especially from Mr. C. S. Bement. These comprise in addition to some of those listed in the preceding note, an exceptionally fine group of twinned cinnabar crystals from Hunan, China (a photograph of which is reproduced); a remarkable danburite crystal from Japan; vesuvianite and achtaragdite from Siberia (photo), a good specimen of crystallized zincite (photo), one of friedelite, one of leucophoenicite, and two crystals and an 11-carat cut stone of yellow willemite, all from Franklin Furnace; nesquehonite from Pa.; inyoite from Nova Scotia; and a large Japanese twinned quartz.

The Yonkers museum, which we have previously mentioned in this column, is making progress. The New York State Board of Regents has acted favorably upon the application for a charter. Donations of mineral specimens have been received from several individuals, and a collection of 83 specimens was presented by the U. S. National Museum.

New Books.—The following books which have appeared during the past few years have not been heretofore noted in this magazine:

Cristalografica Fisica Elemental. Lucas Fernandez-Navarro. 329 pages, 223 figures, 1 colored plate. Madrid, 1917.

La genèse de la science des cristaux. Hélène Metzger. 248 pages. Paris, 1918. (Published by F. Alcan; price 5 fr. 50c.)

Tableaux des constantes des minéraux. Henri Buttgenbach. 86 pages, 4 figures. Liége, 1918. (Published by Imprimerie Vaillant-Carmanne).

The rare-earth industry. . . . Sydney J. Johnstone (with A. S. Russell). 136 pages, 42 figs. London, 1918. (Published by Crosby, Lockwood, and Son; price 9 s.)

Analyse espectral applicada a mineralogia. Alberto Betim-Paes-Leme. 138 pages, 20 figs. Rio de Janeiro, 1918.

Les minéraux et les roches. Etudes practiques de cristallographie, pétrographie, et minéralogie. Second edition. Henri Buttgenbach. 552 pages, 498 figs. Liége, 1919. (Published by Imprimerie Vailliant-Carmanne).

Mineral resources of Georgia and Caucasia; manganese industry of Georgia. D. Ghambashidze. 182 pages, map, and 8 plates. London and N. Y., 1919. (Published by Macmillan Co.; price about $3.00).

Les gîtes minéraux. Stanislas Meunier. 384 pages. Paris, 1919 (Published by Dunod).

Annuaire des mines et minerais métalliques de France et d'Algérie. I. Auguste Pawlowski. 216 4to pages, 3 maps. Paris, 1919. (Published by Annuaires Industriels Heudelot; price 20 fr.).

Compendio de Mineralogia y Litologia. I. Pedro Ferrando-Mas. 216 pages, 99 figs. Zaragoza, Spain, 1919.

PROCEEDINGS OF SOCIETIES

NEW YORK MINERALOGICAL CLUB

February 9, 1921

A regular meeting of the Club was held at the American Museum of Natural History on February 9th, with President George F. Kunz in the chair.

Mr. Paul Walther was elected a member. Mr. Wintringham exhibited a new book entitled "The Nomenclature of Petrology."

Mr. Samuel G. Gordon of Philadelphia then gave an entertaining talk on the Mineral Localities of Pennsylvania, illustrated with many lantern slides of localities and crystal drawings. The activities of the members of the Philadelphia Mineralogical Society were well described, and their enthusiasm in the search for minerals commented upon.

Thru the courtesy of the Museum, the mineral collection was again visited, at the close of the meeting. THOS. I. MILLER, *Secretary pro-tem.*

PHILADELPHIA MINERALOGICAL SOCIETY

Wagner Free Institute of Science, February 10, 1921

A stated meeting of the society was held on the above date with the president, Dr. Hawkins, in the chair. Seventeen members and one visitor were present.

Mr. William C. Knabe read a paper on "The Feldspars," illustrated with a number of specimens. Dr. Hawkins exhibited microcline from Rhode Island and Valhalla, N. Y. Mr. Gordon nominated the following for active membership: Dr. Witmer Stone, Philadelphia; Mr. George Vaux, Jr., Bryn Mawr; and Messrs. Frederick Hilbiber and John Tallis, Schwenksville, Pa. Mr. Hugh Alex. Ford, about to leave for the Belgian Congo, was elected a corresponding member. Mr. Gordon reported a trip to Franklin, N. J., with Mr. Hoadley. SAMUEL G. GORDON, *Secretary*

NEW MINERALS

FAMILY 2, SULFIDES, ETC.

SUBFAMILY 3. DOUBLE SULFIDES OF METALS + SEMI-METALS.

OWYHEEITE[1]

EARL V. SHANNON, *U. S. National Museum.*

PREVIOUS DESCRIPTION.—As "silver-jamesonite," Proc. U. S. Nat. Mus. **58**, 601, 1920.

NAME.—From the locality, Owyhee County, Idaho. Pronounced [like an Indian war-whoop] ō-wȳ-hē-īte.

PHYSICAL PROPERTIES

Form acicular needles in quartz or free in cavities and massive with an indistinct fibrous structure. Crystallization probably orthorhombic. Color light steel gray to silver-white, tarnishing yellowish. Luster metallic to metallic adamantine. Cleavage perpendicular to the elongation of the needles rendering them brittle like jamesonite. Streak on paper gray; on porcelain reddish-brown. Hardness 2.5. Specific gravity not determined.

---

[1] Published by permission of the Secretary of the Smithsonian Institution.

Chemical Properties

In o.t. yields SO_2 and a ring of Sb oxide. In c.t. melts and yields sublimates of S, Sb oxysulfide, and Sb sulfide. Soluble in hot concd. HCl. Analysis gave: Pb 40.77, Cu 0.75, Fe 0.46, Ag 7.40, Sb 30.61, S 20.81, Sum 100.80 per cent.; corresponding to $(Ag, Cu)_2S:5(Pb, Fe)S:3\ Sb_2S_3$ or $Ag_2Pb_5:(Sb_2S_5)_3$. Mineragraphically homogeneous.

Occurrence

In a quartz vein immediately associated with small amounts of pyrargyrite, sphalerite and sericite in white quartz, in the Poorman Mine, Silver City district, Owyhee County, Idaho. This county is mineralogically noteworthy as containing also the only American localities for naumannite, miargyrite, pyrostilpnite and xanthoconite; and it has also produced the most remarkable specimens of crystallized proustite (one crystal weighing 240 kg.), cerargyrite, and ilvaite yet found in the United States.

Discussion

In the original description of this mineral, above cited, the lead and silver were tentatively considered isomorphous, and as it then agreed in ratio more or less with some jamesonite, which it resembles in physical properties, it was provisionally classed as a silver-bearing variety of that mineral. In a recent reclassification of the sulfo-salts, however, Wherry and Foshag[1] point out that in these minerals lead and silver are not isomorphous but present in definite relative amounts. Accordingly, they place jamesonite and this "silver-jamesonite" in different divisions (and groups). A species name is therefore needed for the latter mineral, and is supplied in this note.

The formula here given agrees even better with the analyses than did the one previously suggested. Burton's "argentiferous jamesonite" had the same formula and was no doubt also owyheeite.

ABSTRACTS—MINERALOGY

METEORIC NICKEL-IRON AND THE POLYMORPHISM OF CARBON-IRON. G. Tammann. *Nachr. Ges. Wiss. Göttingen* **1918**, 258–266; thru *Chem. Abstr.* **14** (7), 913–914, 1920.

A discussion of the meteoritic minerals on the basis of crystal structure. E. T. W.

THE BLOWPIPE AS A PYROMETRIC APPARATUS. P. J. Holmquist. *Geol. Fören. Förh.* **39**, 709–720, 1917.

The melting points of minerals can be determined by observation of their behaviors in a certain type of blowpipe flame. W. F. Foshag.

CONTRIBUTION TO THE GEOLOGY OF GALICIA. A NEW OCCURRENCE OF BERYL. Ramon Sobrino-Buhigas. *Bol. Soc. españ. Hist. Nat.*, **16**, 541-543, 1916; thru *Rev. Géol.*, **1** (4), 138, 1920.

At Pontevedre, Galicia, there has been found a fairly perfect crystal of beryl 3 dm. long and weighing 3.45 kg. E. T. W.

SEARCH FOR NICKEL AND COBALT IN CHROMITE AND NATIVE PLATINUM. S. Pina-de Rubies. *Bol. Soc. españ. Hist. Nat.*, **17**, 143–148, 1917; thru *Rev. Géol.*, **1** (4), 138, 1920.

The presence of these elements was proved spectrographically. E. T. W.

---

[1] *J. Wash. Acad. Sci.*, **11** (1), 1–8, 1921.

MINERALOGICAL CHARACTERISTICS OF SPAIN. Lucas Fernandez-Navarro. *Ann. Acad. Polytechn. Porto,* **13** (1), 1–19 and 5–23, 1918; thru *Rev. Géol.* **1** (5), 179, and **1** (9), 330, 1920.

Chiefly economic; all known species are listed. E. T. W.

SOME MINERALS FROM MADAGASCAR. A. Lacroix. *Bull. soc. franc. min.*, **41**, 186–96, 1918.

Descriptions are given of cymophane, monazite, zircon, uranothorite, molybdenite, quartz, cosalite?, topaz, and spinel (picotite). E. T. W.

THE GYPSUM FROM CERRO DE LOS ANGELES, MADRID. Francisco Pardillo. *Bol. Soc. españ. Hist. Nat.*, **17**, 535–537, 1917; thru *Rev. Géol.*, **1** (6), 223, 1920.

The gypsum crystals are thought to be hypostatic pseudomorphs after calcite rhombohedrons $(02\bar{2}1)$ and $(03\bar{3}2)$. E. Hernandez-Pacheco and J. Royo-gomez. **17**, 572–574, 1917; thru *Rev. Géol.*, **1** (7–8), 269, 1920. The pseudomorph theory of preceding abstract is opposed. L. Fernandez-Navarro. **19**, 260–266, 1919; thru *Rev. Géol.*, **1** (5), 179–180 and **1** (9), 331, 1920. The gypsum crystals discussed in prec. abstr. are considered to be metasomatic pseudomorphs after glauberite. F. Pardillo. **19**, 400–401; *Rev. Géol.*, **1** (10), 378. Upholds the calcite theory. E. T. W.

MINERALS FROM SIERRA DE ALGAIREN. Pedro Ferrando-Mas and Jose-L. de Zuazo. *Bol. Soc. españ. Hist. Nat.*, **18**, 400–401, 1918; thru *Rev. Géol.*, **1** (9), 331, 1920.

THE ASSOCIATES OF DIAMOND. E. Hussak and J. B. de Araujo-Ferraz. *Private Publ.* by the 2d author. 56 pages. Rio de Janeiro, 1917; thru *Rev. Géol.*, **1** (10), 377–378, 1920.

Comprises descriptions of the minerals occurring with diamond in Brazil. E. T. W.

A NEW OCCURRENCE OF DUMORTIERITE. Eberhard Rimann. *Ann. l'Ecole Mines Ouro Preto,* No. 15, 19–21, 1917; thru *Rev. Géol.*, **1** (10), 378, 1920.

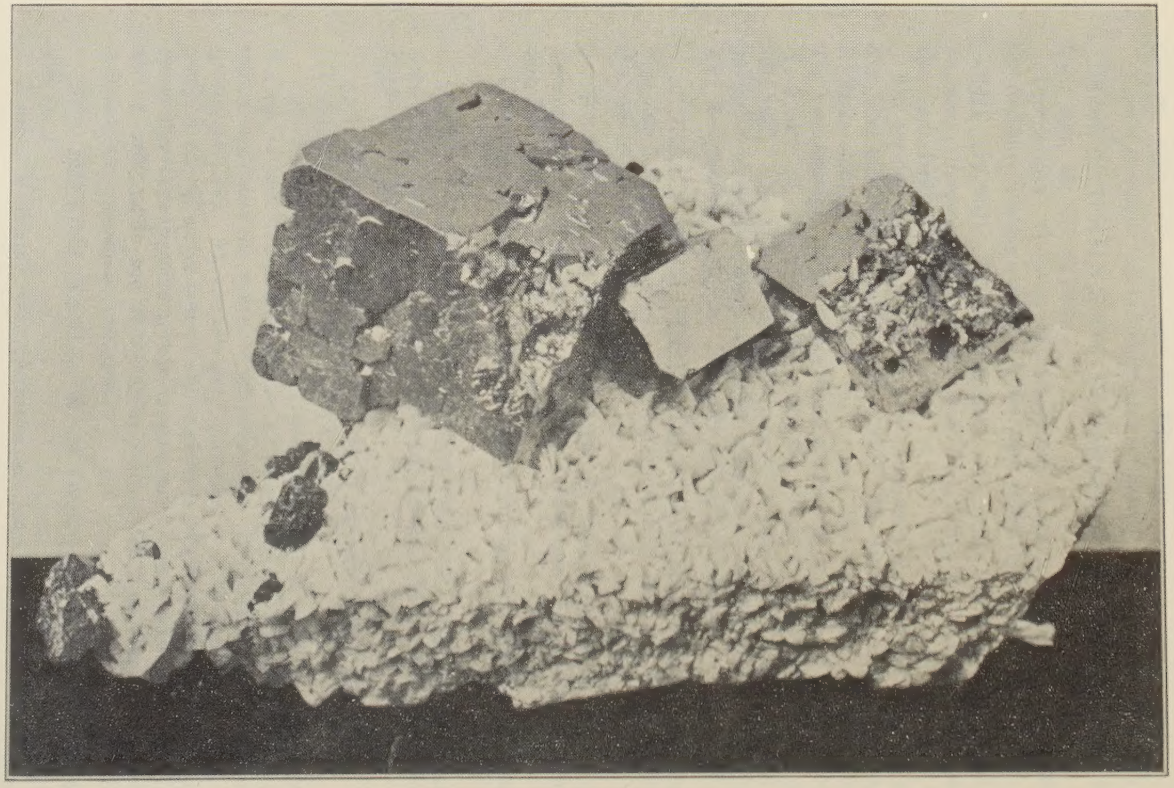
AMBLYGONITE FROM UTÖ. H. Backlund. *Geol. För. Förh.*, **4** , 57–775, 1918; thru *Min. Abstr.*, **1**, 75, 1920.

The optical orientation of a crystal embedded in a Li pegmatite from Utö agrees with that of amblygonite proper, $[\mathrm{Li(Al\ F)PO_4}]$ but the refractive indices approach the values of montebrasite, $[\mathrm{Li(AlOH)PO_4}]$. The specific gravity is 3.065. An analysis gave, however, F 11.10 and H_2O 2.18%. A study of the refractive indices and sp.gr. of 9 samples from various localities shows that the refractive indices increase more rapidly with increasing (OH) at the amblygonite end of the series than at the montebrasite end, which explains the apparent discrepancy. W. F. H.

NEW MINERAL NAMES. W. E. Ford. *Am. J. Sci.*, [4], **47**, 446–448, 1919.

A list of 8 minerals, with properties, all noted in this magazine. E. T. W.

PLATE 4.



Galenite on Dolomite, Joplin, Missouri. (× $\frac{1}{3}$.)

Florence P. Manchester Memorial Collection, Fall River, Mass.